

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT APPLICATION**

Appl. No.	:	10/659,415	Confirmation No. 4622
Applicant	:	Greg E. Howard et al.	
Filed	:	September 10, 2003	
TC/A.U.	:	1725	
Examiner	:	Johnson, Jonathan J	
Docket No.	:	TI-36081	
Customer No.	:	23494	

BRIEF ON APPEAL

M. S. Appeal Brief-Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In support of their appeal of the Final Rejection of claims in this application, applicants respectfully submit this brief.

REAL PARTY IN INTEREST

The real party in interest is Texas Instruments Incorporated, a Delaware corporation with offices at 7839 Churchill Way, Dallas, Texas 75251.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences.

STATUS OF CLAIMS

This is an appeal of claims 9 through 15. Claims 1 through 8 and 16 through 20 have been canceled from this examination.

STATUS OF AMENDMENTS

Appellants did not file an amendment in response to the final rejection of May 16, 2006.

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 9 is the only independent claim; it describes a system for stud bumping. The system has the following elements:

- a. a bonding head (102) having a plurality of wire passages (104) formed therein¹;
- b. a plurality of wires (106) disposed through respective ones of the plurality of wire passages (104)²;
- c. a substrate (202) having a plurality of bond pads (204)³; and
- d. a robot (112) coupled to the bonding head (102), the robot operable to form a first set of stud bumps (200) outwardly from respective ones of a first set of the bond pads (204)⁴.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Shalon et al.⁵

ARGUMENTS

1. The Shalon et al. reference does not disclose all the claim elements in claim 9.

Applicants respectfully submit that the 102(b) rejection against claim 9 based on the Shalon et al. reference is improper because the reference does not disclose all the claim elements in claim 9 of this application, particularly element (b) as listed

¹ Please see, e.g., page 5, lines 10-14 of this application.

² *Id.*

³ *Id.* page 6, lines 21-22.

⁴ *Id.* lines 25-29

⁵ U.S. Patent No. 6,309,891, issued Oct. 30, 2001 from an application filed Sep. 9, 1998 by Tidhar D. Shalon et al.

in the SUMMARY OF CLAIMED SUBJECT MATTER section of this brief.

In element (b) of claim 9, the system requires a plurality of wires (106) disposed through respective ones of the plurality of wire passages (104). The Shalon et al. patent does not disclose at least this element.

It is well established that a claim is anticipated “if every limitation in a claim is found in a single prior art reference, either explicitly or inherently.”⁶ Shalon et al. do not disclose “a plurality of wires disposed through respective ones of the plurality of wire passages” either explicitly or inherently.

The Final Office Action argues that Shalon explicitly teaches that the bonding head (figure 1, item 12 and capillary) have passages (col. 6, l. 35, the passages in the capillary) that have wires through the ones of the passages (col. 6, ll. 40-46 and 60-65).⁷ However, the Shalon et al. patent does not support this argument:

First, item 12 in figure 1 of the Shalon patent is not a bonding head. In figure 1, item 12 is referred to as “gang”, and in figure 2, item 12 is referred to as “a gang print head”. It does not disclose a bond head.

Referring to FIG. 1, a plurality of printing devices 11 are shown housed in receptacles of a gang 12 comprising tabs 13 for attaching to a pod (not shown) of a printing system.

Referring to FIG. 2, a plurality of printing devices 11 are shown housed in receptacles of a gang print head 12 comprising tabs 13. Above the print head 12 is a spring block 21 retaining a plurality of vertical actuators 22. Below the print head 12 is a registration plate 23 comprising a plurality of registration apertures 24.⁸

Second, instead of a bonding head, the Shalon patent clearly states in a sentence immediately before the two sections cited in the Final Office Action that it teaches a printing system:

...the invention provides a printing system comprising a wire bonding capillary containing a predetermined agent and comprising an axial bore having proximal and distal openings to ambient pressure and a printing tip comprising the distal opening and which prints the agent.⁹

In this context, Shalon explains in the cited paragraphs the wire-bonding process used in the semiconductor manufacturing:

⁶ See MEHL/Biophile Int'l corp. v. Milgraum, 192 F.3d. 1362, 1365 (Fed. Cir. 1999).

⁷ Final Office Action, May 16, 2006, page 4.

⁸ Shalon, *supra*, col. 7, lines 17-25.

Wire bonding capillaries are adapted from semiconductor manufacturing, where a wire bonding process is used to electrically connect metal bond pads formed on a semiconductor die to the leadfingers of a leadframe. In this process, a bond wire is threaded through a wire bonding capillary and the end of the wire protruding through the capillary tip is heated to a molten ball. The molten ball is then mechanically pressed by the bonding capillary against the heated bond pad to alloy the metallic elements of the wire and bond pad.¹⁰

This paragraph and the previous paragraph explain the working of a semiconductor wire-bonder and the wire-bonding process. It does not disclose “a plurality of wires disposed through respective ones of the plurality of wire passages.”

In the lastly cited paragraph, Shalon describes the embodiment of the invention as follows:

In a more particular embodiment, the invention provides a printing system comprising a ganged plurality of wire bonding capillaries, each containing a different agent and comprising an axial bore having proximal and distal openings to ambient pressure and a printing tip comprising the distal opening and which prints the agent.¹¹

Shalon teaches using wire bonding capillaries, each contains a printing agent and a printing tip for printing. There is no disclosure of “a plurality of wires disposed through respective ones of the plurality of wire passages” either explicitly or inherently.

2. “A plurality of wires disposed through respective ones of the plurality of wire passages” is a structure limitation, not a process limitation.

The Final Office Action argues that because the capillary tips are capable of having wires disposed through the passages, it anticipates the claim element of “a plurality of wires disposed through respective ones of the plurality of wire passages.” This argument is based on the premise that “the wire is a process limitation that holds little patentable weight in the apparatus claim.”¹²

Applicants respectfully submit that this argument is untenable for several reasons.

First, the Final Office Action never explains why among all the elements in claim 9 – a bonding head, wire passages in the bonding head, a plurality of wires, a

⁹ *Id.* col. 6, lines 33-38.

¹⁰ *Id.* col. 6, lines 39-47.

¹¹ *Id.* col. 6, lines 59-64.

substrate, a plurality of bond pads, and a robot – only the wires are singled out as being a “process limitation.”

Second, the Examiner cites In re Barr for the proposition that “functional language is acceptable as long as it sets definite boundaries on the patent protection sought.”¹³ However, the language that requires “a plurality of wires disposed through respective ones of the plurality of wire passages” describes a claim element and specifies the relative position of the element and the rest of the system. It does not make the plurality of wires a “functional language” just because the wires are capable of being treaded through respective ones of the plurality of wire passages.

Third, the Examiner cites In re Casey and In re Otto for the proposition that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art; and in a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art.¹⁴ Again, the applicants respectfully submit that the limitation “a plurality of wires disposed through respective ones of the plurality of wire passages” does not describe the intended use of the claimed invention; it does not describe a process of making. It describes a claim element “a plurality of wires” and it describes the relative position of the element to the rest of the system.

In conclusion, applicants respectfully submit that because the Shalon et al. patent fails to disclose all the claim limitations of claim 9; and because the claim limitation “a plurality of wires disposed through respective ones of the plurality of wire passages” describes a structural limitation of claim 9, the Shalon reference can not anticipate claim 9 and claim 9 stands patentable over the reference.

¹² Final Office Action, *supra*, page 4.

¹³ *Id.* page 3.

¹⁴ *Id.*

Applicants respectfully request the Board to reverse the final rejection and allow claim 9 and its dependent claims on appeal.

Respectfully submitted,

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CLAIMS APPENDIX

The claims on appeal read as follows:

9. A system for stud bumping, comprising:
 - a bonding head having a plurality of wire passages formed therein;
 - a plurality of wires disposed through respective ones of the plurality of wire passages;
 - a substrate having a plurality of bond pads; and
 - a robot coupled to the bonding head, the robot operable to form a first set of stud bumps outwardly from respective ones of a first set of the bond pads.
10. The system of Claim 9, wherein the bonding head is formed from a ceramic.
11. The system of Claim 9, wherein the wires are formed from a material selected from the group consisting of gold and aluminum.
12. The system of Claim 9, wherein a pitch between any two adjacent wire passages is no more than 1000 microns.
13. The system of Claim 9, wherein a pitch between any two adjacent wire passages is no more than 200 microns.
14. The system of Claim 9, wherein the wire passages resemble an array selected from the group consisting of a linear array and a rectangular array.
15. The system of Claim 9, wherein the robot is operable to simultaneously engage the wires with respective ones of the bond pads to form the stud bumps.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None